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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/477,101	01/04/2000	LINDEN A. DECARMO	N0003/7030	8713

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EXAMINER	
ALI, SYED J	

ART UNIT	PAPER NUMBER
2127	11

DATE MAILED: 02/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/477,101	DECARMO, LINDEN A.	
	Examiner	Art Unit	
	Syed J Ali	2127	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to Amendment B, paper number 10, which was filed December 1, 2003. Claims 1-19 are presented for examination.

2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

Claim Rejections - 35 USC § 103

3. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sudo (previously cited) in view of Eilert et al. (previously cited) (hereinafter Eilert) in view of Achenson et al. (previously cited) (hereinafter Achenson).

As per claim 1, Sudo discloses in a computer system, a method, performed at a manager (col.. 7 line 60 - col. 8 line 11, "threads are transferred from a heavily loaded node to a lightly loaded node using a thread transfer mechanism provided in an operating system"), of distributing call flow events among a plurality of processing nodes (col. 3 lines 46-60, "the present invention relates to a load distribution method having a mechanism of connecting a plurality of information processing apparatuses with a network, and executing a distributed task...by distributing threads in the respective information processing apparatuses"), the method comprising:

a. determining a call flow workload level for each of the plurality of processing nodes (col. 7 lines 7-19, "each load distribution server basically monitors information relating to the corresponding node, and intends to perform load distribution when the load of the node decreases or increases");

b. determining that a first of the plurality of processing nodes is inefficiently handling its assigned call flow workload (col. 7 lines 7-19, "If the load exceeds the upper threshold, the server intends to reduce the load of the node"); and

c. reassigning a call flow event from the call flow event queue associated with the first processing node to the call flow event queue associated with a second of the plurality of processing nodes (col. 7 lines 20-26, "In order to reduce the load of the concerned node, a node having a lighter load than the load of the concerned node is searched for by collecting load information about other nodes").

Eilert discloses the following limitations not shown by Sudo, specifically that call flow events are distributed among a plurality of threads (col. 1 lines 13-33, "Workload management is a concept whereby units of work [processes, threads, etc.] that are managed by an operating system are organized into classes...that are provided system resources"), determining a call flow workload level for each of a plurality of threads on a software level (col. 2 lines 17-39, "The invention includes...measuring performance of the work units on that system to create local performance data"), as opposed to the determination of a workload of a processing node disclosed by Sudo on a hardware level, and the adjustment of resource allocation in response to the determination that a work unit is inefficiently processing its workload (col. 1 lines 13-33, "Resources are reassigned from a donor class to a receiver class if the improvement in performance of the receiver class resulting from such reassignment exceeds the degradation in performance of the donor class"). It is noted that the adjustment of control parameters related to shared resources is not a dynamic balancing of call flow events, but rather an effort to reassign

resources to improve the performance of work units. This still has the drawback of not allowing a rebalancing of the thread queue's workload once execution has started.

Achenson discloses the following limitations not shown by either Sudo or Eilert, specifically each thread having an associated call flow event queue in which call flow events are queued (col. 4 line 66 – col. 5 line 13, "block 30 is shown including threads and associated queues for the threads").

It would have been obvious to one of ordinary skill in the art to combine Sudo, Eilert, and Achenson since the method disclosed by Sudo of allowing rebalancing of workload from a heavily loaded node to a lightly loaded node is concerned with the entire thread of execution, and does not allow the redistribution of events from one thread to another. Achenson and Eilert make up for this deficiency by providing each thread with a work queue, and a method of monitoring the performance of a thread during execution. However, in response to inefficient performance of the thread, a control parameter for accessing shared resources is modified to improve the performance. This has the drawback of potentially degrading the performance of threads from which the shared resources are taken, wherein the problem of work units inefficiently handling their processing load is not solved. Thus, to utilize the workload balancing method of Sudo could be applied by rebalancing the workload of each thread by redistributing events from a heavily loaded node (or thread) to a lightly loaded node (or thread), for instance by the message passing mechanism of Achenson, further improving the performance of each thread.

As per claim 2, Achenson discloses the method according to claim 1 further comprising the step:

d. processing the call flow events associated with each of the plurality of threads (col. 5 lines 36-47, "The thread and queue pairs, in blocks 40, 42, 44 as shown in Process 1 are referred to as worker threads", wherein the worker thread processes work from the queue associated with it).

It would have been obvious to one of ordinary skill in the art to combine Sudo, Eilert, and Achenson for reasons discussed above in reference to claim 1.

As per claim 3, Sudo discloses the method according to claim 1 wherein step c. further comprises:

c1. removing a call flow event from the call flow event queue associated within the first thread (col. 5 lines 10-22, "threads within the distributed task in operation are transferred from a heavily loaded node to a lightly loaded node"); and

c2. placing the removed call flow event in the call flow event queue associated with the second thread (col. 5 lines 10-22, "threads within the distributed task in operation are transferred from a heavily loaded node to a lightly loaded node");.

It is noted that the reassigning therein is not specifically related to call flow event queues. However, this deficiency is made up for in the disclosures of Eilert and Achenson, as discussed above in reference to claim 1. Hereinafter, the reallocation of threads disclosed in Sudo will be considered applicable to reallocation of events among queues as well, as discussed in reference to claim 1.

As per claim 4, Sudo discloses the method according to claim 1 wherein step c. further comprises:

c1. selecting the second thread in accordance with the number of call flow events in the call flow event queue associated with the second thread (col. 5 lines 10-22, "threads within the distributed task in operation are transferred from a heavily loaded node to a lightly loaded node", wherein the selection of the second node to transfer the thread is to is determined by its workload).

As per claim 5, Sudo discloses the method according to claim 1 wherein step c further comprises:

c1. allocating the call flow events to a thread within the computer system with the least call flow load (Fig. 6, col. 5 lines 10-22, "threads within the distributed task in operation are transferred from a heavily loaded node to a lightly loaded node", wherein Fig. 6 shows how the redistribution of tasks balances threads by taking threads from the most heavily loaded node and transfers them to the most lightly loaded node).

As per claim 6, Eilert discloses the method according to claim 1 wherein step b further comprises:

b1. determining whether the number of call flow events in the call flow event queue associated with a thread has exceeded a predetermined criteria (col. 4 lines 39-46, "the performance of that particular work unit factors into whether or not the particular work class is meeting the goals [141] of the work class").

It would have been obvious to one of ordinary skill in the art to combine Sudo, Eilert, and Achenson for reasons discussed above in reference to claim 1.

As per claim 7, Eilert discloses the method according to claim 1, wherein step a comprises:

a1. assigning call flow events among the call flow queues associated with the respective plurality of threads in the system (col. 1 lines 13-33, "Workload management is a concept whereby units of work [processes, threads, etc.] that are managed by an operating system are organized into classes...that are provided system resources").

It would have been obvious to one of ordinary skill in the art to combine Sudo, Eilert, and Achenson for reasons discussed above in reference to claim 1.

As per claim 17, Sudo discloses the method according to claim 1, further comprising:

d. determining whether a call flow balance has been achieved among the plurality of threads (col. 5 lines 10-22, "In step S2, it is determined if the load information of each information processing apparatus collected in step S1 is equal", wherein the redistribution of threads continues until a balance has been achieved).

Achenson discloses the method according to claim 1, further comprising:

e. processing the call flow events associated with each of the plurality of threads (col. 5 lines 36-47, "The thread and queue pairs, in blocks 40, 42, 44 as shown in Process 1 are referred to as worker threads", wherein the worker thread processes work from the queue associated with it).

It would have been obvious to one of ordinary skill in the art to combine Sudo, Eilert, and Achenson for reasons discussed above in reference to claim 1.

As per claims 8-14 and 18, they are rejected for similar reasons as stated for claims 1-7 and 17 above, respectively. Specifically, a computer program product having a computer usable medium having program code embodied in the medium, operable to perform the method of claims 1-7 and 17 is disclosed by Sudo (see Figs. 1 and 2 of Sudo).

As per claims 15-16 and 19, they are rejected for similar reasons as stated for claims 1-7 and 17 above. Specifically, all of the limitations presented in claims 15-16 and 19 are similar to limitations within claims 1-7 and 17. Furthermore, the combination of Sudo, Eilert and Achenson discloses an apparatus adapted to perform the method of claims 1-7 and 17 (see Fig. 1 of Eilert).

Response to Arguments

4. Applicant's arguments with respect to claims 1-19 have been considered but are moot in view of the new grounds of rejection.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
February 10, 2004